

What we claim is:

1. A virtual network construction method comprising the steps of:  
generating and multicasting control packets each having set a  
multicast address predetermined per virtual network in first relaying  
5 apparatuses originating a virtual network within a public data  
communication network, and

establishing virtual links to the first relaying apparatuses which  
are transmitting sources of the control packets upon receipt thereof  
and returning reply packets through the virtual links in second  
10 relaying apparatuses belonging to the multicast address group,

whereby the virtual links are established between all pairs of the  
first and the second relaying apparatuses belonging to the multicast  
address group to construct the virtual network.

2. The virtual network construction method as claimed in claim 1  
15 wherein the second relaying apparatuses authenticate the control  
packets received.

3. The virtual network construction method as claimed in claim 1  
wherein the virtual links comprise IP tunnels.

4. The virtual network construction method as claimed in claim 1  
20 wherein the virtual links comprise MPLS tunnels.

5. A virtual network construction system comprising:

first relaying apparatuses for generating and multicasting, when  
starting a construction of a virtual network within a public data  
communication network, control packets each having set a multicast  
25 address predetermined per virtual network, and

second relaying apparatuses for establishing virtual links to the  
first relaying apparatuses which are transmitting sources of the  
control packets upon receipt thereof and for returning reply packets  
through the virtual links,

30 whereby the virtual links are established between all of the first  
and the second relaying apparatuses belonging to the multicast

address group by operations thereof to construct the virtual network.

6. The virtual network construction system as claimed in claim 5 wherein the second relaying apparatuses establishing the virtual links authenticate the control packets received.

5 7. The virtual network construction system as claimed in claim 5 wherein the virtual links comprise IP tunnels.

8. The virtual network construction system as claimed in claim 5 wherein the virtual links comprise MPLS tunnels.

9. A relaying apparatus, which terminates a virtual network within  
10 a public data communication network comprising:

means for generating and multicasting control packets each having set a multicast address predetermined per virtual network, and

means for establishing virtual links to other relaying  
15 apparatuses which are transmitting sources of the control packets upon receipt thereof and for returning reply packets through the virtual links,

whereby the virtual links are established between all of the relaying apparatuses belonging to the multicast address group to  
20 construct the virtual network.

10. The relaying apparatus as claimed in claim 9, further comprising means for authenticating the control packets received.

11. The relaying apparatus as claimed in claim 9, further comprising means for generating a routing table for each of a plurality of virtual  
25 networks logically independent of one another, and means for performing a packet relay of each virtual network based on the routing table.

12. The relaying apparatus as claimed in claim 9 wherein the virtual links comprise IP tunnels.

30 13. The relaying apparatus as claimed in claim 9 wherein the virtual links comprise MPLS tunnels.